

## **ABSTRACT**

Biological nutrient removal (BNR) in municipal wastewater treatment to remove carbonaceous substrates, nutrients and phosphorus, has recently become increasingly popular worldwide due to increasingly stringent regulations. Biological fluidized bed (BFB) technology, which could be potentially used for BNR processes, can provide some advantages such as high efficiency and compact structure. This present invention incorporates the fixed-film biological fluidized bed technology with the biological nutrient removal in a liquid-solid circulating fluidized bed, which has achieved the simultaneous elimination of organic carbon, nitrogen and phosphorus, in a very efficient manner and with very compact space requirements. The BNR-LSCFB has two fluidized beds, running as anoxic/anaerobic and aerobic processes to accomplish simultaneous nitrification and denitrification and to remove carbonaceous substrates, nutrients and phosphorus, with continuous liquid and solids recirculation through the anoxic/anaerobic bed and the aerobic bed. The new BNR-LSCFB system is not only an excellent alternative for conventional activated sludge type BNR technologies but is also capable of processing much higher loadings and suitable for industrial applications.